IN THE CLAIMS

Please amend claim 1, 2, and 19, and add claims 21 through 28 as follows.

1. (Currently amended) A method of driving a 3-electrode plasma display apparatus, the method comprising:

converting an external analog video signal into a digital signal to generate an internal video signal;

generating drive control signals at a controller in response to the internal video signal;

processing an X-drive control signal output from the controller and applying the result of said processing of the X-drive control signal to X-electrode lines;

processing a Y-drive control signal output from the controller and applying the result of said processing of the Y-drive control signal to Y-electrode lines;

processing an address signal at an address driver to generate display data signals and applying the display data signals to address electrode lines, the address signal being output from the controller, the apparatus including a 3-electrode plasma display panel, with the panel including the X-electrode lines, Y-electrode lines, and address electrode lines, the X-electrode lines and Y-electrode lines being alternately arranged in parallel on a rear surface of a front transparent substrate to form XY-electrode line pairs, the address electrode lines being arranged on a front surface of a rear transparent substrate to cross the XY-electrode line pairs, with intersections of the XY-electrode line pairs and the address electrode lines defining display cells;

~~collecting excess charges remaining in the display cells when said applying of the display~~

~~data signals ends, said collecting being performed by a power recovery circuit included in the address driver;~~

~~applying the collected changes to the display cells when said applying of the display data signals starts; and~~

controlling operation and non-operation of ~~the~~ a power recovery circuit in ~~dependence upon said applying of~~ accordance with the display data signals to be applied to the address electrode lines, said power recovery circuit being included in the address driver;

collecting excess charges remaining in the display cells upon said operation of said power recovery circuit at the end of said applying the display data signals, said collecting excess charges being performed by said power recovery circuit; and

applying the collected charges to the display cells upon said operation of said power recovery circuit at the start of said applying the data display data signals.

2. (Currently amended) ~~The method of claim 1, further comprising:~~

A method of driving a 3-electrode plasma display apparatus, the method comprising:

converting an external analog video signal into a digital signal to generate an internal video signal;

generating drive control signals at a controller in response to the internal video signal;

processing an X-drive control signal output from the controller and applying the result of said processing of the X-drive control signal to X-electrode lines;

processing a Y-drive control signal output from the controller and applying the result of said

processing of the Y-drive control signal to Y-electrode lines;

processing an address signal at an address driver to generate display data signals and applying the display data signals to address electrode lines, the address signal being output from the controller, the apparatus including a 3-electrode plasma display panel, with the panel including the X-electrode lines, Y-electrode lines, and address electrode lines, the X-electrode lines and Y-electrode lines being alternately arranged in parallel on a rear surface of a front transparent substrate to form XY-electrode line pairs, the address electrode lines being arranged on a front surface of a rear transparent substrate to cross the XY-electrode line pairs, with intersections of the XY-electrode line pairs and the address electrode lines defining display cells;

collecting excess charges remaining in the display cells when said applying of the display data signals ends, said collecting being performed by a power recovery circuit included in the address driver;

applying the collected charges to the display cells when said applying of the display data signals starts;

controlling operation and non-operation of the power recovery circuit in dependence upon said applying of the display data signals to the address electrode lines;

uniformizing charges in display cells to be driven, said uniformizing corresponding to an initialization step;

determining a charge state of display cells to be turned on and a charge state of display cells to be turned off, said determining corresponding to an address step; ~~and~~

provoking the display cells to be turned on to perform a display discharge, said provoking

corresponding to a display-sustaining step; and

said uniformizing, determining, and provoking being performed in a unit subfield, the operation and non-operation of the power recovery circuit being controlled in dependence upon the display data signals applied to the address electrode lines in the address step.

3. (Original) The method of claim 2, with the operation and non-operation of the power recovery circuit being controlled for each subfield in accordance with the display data signals of the respective subfield.

4. (Original) The method of claim 3, with said controlling of the operation and non-operation of the power recovery circuit comprising:

obtaining a line data variation between display data of each XY-electrode line pair to be scanned first and display data of each XY-electrode line pair to be scanned next, for each of the XY-electrode line pairs of a subfield to be displayed;

obtaining a sum of line data variations obtained for all of the XY-electrode line pairs of the subfield to be displayed;

obtaining a cell data variation between the display cells corresponding to the line data variation and adjacent display cells, for all of the XY-electrode line pairs of the subfield to be displayed;

obtaining a sum of cell data variations obtained for all of the XY-electrode line pairs of the subfield to be displayed;

adding the sum of line data variations and the sum of cell data variations to obtain a total of data variations in the subfield to be displayed; and

operating the power recovery circuit when the total of data variations in the subfield to be displayed exceeds a predetermined reference value.

5. (Original) The method of claim 4, with said obtaining of the line data variation comprising:

performing an exclusive OR operation on the display data of the XY-electrode line pair to be scanned first and the display data of the XY-electrode line pair to be scanned next; and

setting the line data variation to be equal to number of 1s in data resulting from the exclusive OR operation.

6. (Original) The method of claim 5, with said obtaining of the cell data variation comprising:

performing an AND operation on the display data of the XY-electrode line pair to be scanned first and the data resulting from the exclusive OR operation to obtain a first variation data;

performing an AND operation on the display data of the XY-electrode line pair to be scanned next and the data resulting from the exclusive OR operation to obtain a second variation data; and

obtaining number of bits of different data between the first variation data and the second variation data and setting the obtained number as the cell data variation.

7. (Original) The method of claim 3, with said controlling of the operation and non-operation of the power recovery circuit comprising:

counting number of display cells to be turned on corresponding to each of the XY-electrode line pairs of a subfield to be displayed;

counting number of display cells to be turned off in adjacency of the display cells to be turned on;

adding the number of display cells to be turned on and the number of display cells to be turned off in adjacency of the display cells to be turned on; and

when the result of the addition exceeds a predetermined reference value, not operating the power recovery circuit.

8. (Original) The method of claim 2, with said controlling of the operation and non-operation of the power recovery circuit being performed for each of the XY-electrode line pairs in dependence upon display data of an XY-electrode line pair to be scanned first and display data of an XY-electrode line pair to be scanned next.

9. (Original) The method of claim 8, with said controlling of the operation and non-operation of the power recovery circuit comprising:

obtaining a line data variation between the display data of the XY-electrode line pair to be scanned first and the display data of the XY-electrode line pair to be scanned next;

obtaining a cell data variation between display cells corresponding to the line data variation and their adjacent display cells;

adding the line data variation and the cell data variation to obtain a total of data variations;

and

when the total data variation exceeds a predetermined reference value, operating the power recovery circuit.

10. (Original) The method of claim 9, with said obtaining of the line data variation comprising:

performing an exclusive OR operation on the display data of the XY-electrode line pair to be scanned first and the display data of the XY-electrode line pair to be scanned next; and

setting number of 1s in data resulting from the exclusive OR operation as the line data variation.

11. (Original) The method of claim 10, with said obtaining of the cell data variation comprising:

performing an AND operation on the display data of the XY-electrode line pair to be scanned first and the data resulting from the exclusive OR operation to obtain a first variation data;

performing an AND operation on the display data of the XY-electrode line pair to be scanned next and the data resulting from the exclusive OR operation to obtain a second variation data; and

obtaining number of bits of different data between the first variation data and the second variation data and setting the obtained number as the cell data variation.

12. (Original) The method of claim 8, with said controlling of the operation and

non-operation of the power recovery circuit comprising:

counting number of display cells to be turned on corresponding to the XY-electrode line pair to be scanned next;

counting number of display cells to be turned off in adjacency of the display cells to be turned on;

adding the number of display cells to be turned on and the number of display cells to be turned off in adjacency of the display cells to be turned on; and

when the result of the addition exceeds a predetermined reference value, not operating the power recovery circuit.

13. (Original) The method of claim 2, further comprising:

classifying the address electrode lines into at least a first address electrode line group and a second address electrode line group, the address driver including at least a first address sub-driver and a second address sub-driver, the power recovery circuit including at least first power recovery sub-circuit and a second power recovery sub-circuit, the first power recovery sub-circuit having an output connected to a power supply voltage line of the first address sub-driver, the second power recovery sub-circuit having an output connected to a power supply voltage line of the second address sub-driver;

driving the first address electrode line group by the first address sub-driver; and

driving the second address electrode line group by the second address sub-driver.

14. (Original) The method of claim 13, with the operation and non-operation of the first power recovery sub-circuit and the second power recovery sub-circuit being controlled for each subfield in dependence upon the display data signals of the subfield.

15. (Original) The method of claim 14, with said controlling of the operation and non-operation of the power recovery circuit comprising:

obtaining a first line data variation between display data of each XY-electrode line pair to be scanned first and display data of each XY-electrode line pair to be scanned next, for the first address electrode line group and each of the XY-electrode line pairs of a subfield to be displayed;

obtaining a second line data variation between display data of each XY-electrode line pair to be scanned first and display data of each XY-electrode line pair to be scanned next, for the second address electrode line group and each of the XY-electrode line pairs of the subfield to be displayed;

obtaining a first sum of line data variations obtained for the first address electrode line group and all of the XY-electrode line pairs of the subfield;

obtaining a second sum of line data variations obtained for the second address electrode line group and all of the XY-electrode line pairs of the subfield;

obtaining a first cell data variation between display cells corresponding to the line data variation and adjacent display cells, for the first address electrode line group and all of the XY-electrode line pairs of the subfield;

obtaining a second cell data variation between display cells corresponding to the line data variation and adjacent display cells, for the second address electrode line group and all of the

XY-electrode line pairs of the subfield;

obtaining a first sum of cell data variations obtained for the first address electrode line group and all of the XY-electrode line pairs of the subfield;

obtaining a second sum of cell data variations obtained for the second address electrode line group and all of the XY-electrode line pairs of the subfield;

adding the first sum of line data variations and the first sum of cell data variations to obtain a first total of data variations in the subfield;

adding the second sum of line data variations and the second sum of cell data variations to obtain a second total of data variations in the subfield;

when the first total data variation of the subfield exceeds a predetermined reference value, operating the first power recovery sub-circuit; and

when the second total data variation of the subfield exceeds a predetermined reference value, operating the second power recovery sub-circuit.

16. (Original) The method of claim 14, with said controlling of the operation and non-operation of the power recovery circuit comprising:

counting number of first display cells to be turned on corresponding to the first address electrode line group and each of the XY-electrode line pairs of a subfield to be displayed;

counting number of second display cells to be turned on corresponding to the second address electrode line group and each of the XY-electrode line pairs of the subfield to be displayed;

counting number of first adjacent display cells to be turned off in adjacency of the first

display cells to be turned on;

counting number of second adjacent display cells to be turned off in adjacency of the second display cells to be turned on;

adding the number of the first display cells to be turned on and the number of the first adjacent display cells to be turned off in adjacency of the first display cells to be turned on, to obtain a first addition result;

adding the number of the second display cells to be turned on and the number of the second adjacent display cells to be turned off in adjacency of the second display cells to be turned on, to obtain a second addition result;

when the first addition exceeds a predetermined reference value, not operating the first power recovery sub-circuit; and

when the second addition exceeds a predetermined reference value, not operating the second power recovery sub-circuit.

17. (Original) The method of claim 13, with the operation and non-operation of the first power recovery sub-circuit and the second power recovery sub-circuit being controlled for each XY-electrode line pair in dependence upon display data of an XY-electrode line pair to be scanned first and display data of an XY-electrode line pair to be scanned next.

18. (Original) The method of claim 17, with said controlling of the operation and non-operation of the power recovery circuit comprising:

obtaining a first line data variation between the display data of the XY-electrode line pair to be scanned first and the display data of the XY-electrode line pair to be scanned next, corresponding to the first address electrode line group;

obtaining a second line data variation between the display data of the XY-electrode line pair to be scanned first and the display data of the XY-electrode line pair to be scanned next, corresponding to the second address electrode line group;

obtaining a first cell data variation between display cells corresponding to the first line data variation and their adjacent display cells;

obtaining a second cell data variation between display cells corresponding to the second line data variation and their adjacent display cells;

adding the first line data variation and the first cell data variation to obtain a first total of data variations;

adding the second line data variation and the second cell data variation to obtain a second total of data variations;

when the first total data variation exceeds a predetermined reference value, operating the first power recovery sub-circuit; and

when the second total data variation exceeds a predetermined reference value, operating the second power recovery sub-circuit.

19. (Currently amended) The method of claim 17, with said controlling of the operation and non-operation of the power recovery circuit comprising:

counting number of first display cells to be turned on corresponding to the first address electrode line group and the XY-electrode line pair to be scanned next;

counting number of second display cells to be turned on corresponding to the second address electrode line group and the XY-electrode line pair to be scanned next;

counting number of first adjacent display cells to be turned off in adjacency of the first display cells to be turned on;

counting number of second adjacent display cells to be turned off in adjacency of the second display cells to be turned on;

adding the number of the first display cells to be turned on and the number of the first adjacent display cells to be turned off, to obtain a first addition result;

adding the number of the second display cells to be turned on and the number of the second adjacent display cells to be turned off, to obtain a second addition result;

when the first addition result exceeds a predetermined reference value, not operating the first power recovery sub-circuit; and

when the second addition result exceeds a predetermined reference value, not operating the second power recovery sub-circuit.

20. (Original) The method of claim 2, with the operation and non-operation of the power recovery circuit being controlled for each frame in dependence upon display data signals of the frame composed of a plurality of subfields.

21. (New) A method of driving a plasma display apparatus, the method comprising:

processing an address signal at an address driver to generate display data signals and applying the display data signals to address electrode lines;

controlling operation and non-operation of a power recovery circuit in accordance with the display data signals, said power recovery circuit being included in said address driver;

collecting excess charges remaining in the display cells upon said operation of said power recovery circuit at the end of said applying the display data signals, said collecting excess charges being performed by said power recovery circuit; and

applying the collected charges to the display cells upon said operation of said power recovery circuit at the start of said applying the data display data signals.

22. (New) The method of claim 21, further comprising:

uniformizing charges in display cells to be driven, said uniformizing corresponding to an initialization step;

determining a charge state of display cells to be turned on and a charge state of display cells to be turned off, said determining corresponding to an address step;

provoking the display cells to be turned on to perform a display discharge, said provoking corresponding to a display-sustaining step; and

said uniformizing, determining, and provoking being performed in a unit subfield, the operation and non-operation of the power recovery circuit being controlled in dependence upon the display data signals applied to the address electrode lines in the address step.

23. (New) The method of claim 22, with the operation and non-operation of the power recovery circuit being controlled for each subfield in accordance with the display data signals of the respective subfield.

24. (New) The method of claim 22, further comprising:

classifying the address electrode lines into at least a first address electrode line group and a second address electrode line group, the address driver including at least a first address sub-driver and a second address sub-driver, the power recovery circuit including at least first power recovery sub-circuit and a second power recovery sub-circuit, the first power recovery sub-circuit having an output connected to a power supply voltage line of the first address sub-driver, the second power recovery sub-circuit having an output connected to a power supply voltage line of the second address sub-driver;

driving the first address electrode line group by the first address sub-driver; and

driving the second address electrode line group by the second address sub-driver.

25. (New) A display apparatus, comprising:

a plasma display panel comprising X-electrode lines, Y-electrode lines, and address electrode lines, said X-electrode lines and said Y-electrode lines being alternately arranged in parallel on a rear surface of a front transparent substrate to form XY-electrode line pairs, said address electrode lines being arranged on a front surface of a rear transparent substrate to cross the XY-

electrode line pairs, with intersections of the XY-electrode line pairs and the address electrode lines defining display cells;

a driving apparatus for driving said plasma display panel, said driving apparatus including a video processor, a logic controller, an address driver, a X-driver, and a Y-driver, said address driver generating display data signals, said display data signals being determined by a charge state of display cells to be turned on and a charge state of display cells to be turned off; and

a power recovery circuit for collecting excess charges remaining in display cells and applying the collected charges to said display cells, said power recovery circuit being included in said address driver, operation and non-operation of said power recovery circuit being controlled in dependence upon said display data signals.

26. (New) The display apparatus of claim 25, with said driving apparatus generating a first waveform for uniformizing charges in display cells and a second waveform for provoking the display cells to be turned on to perform a display discharge.

27. (New) The display apparatus of claim 26, with said power recovery circuit being controlled by obtaining a line data variation and a cell data variation, said line data variation being obtained between display data of each XY-electrode line pair to be scanned first and display data of each XY-electrode line pair to be scanned next, said cell data variation being obtained between display cells corresponding to the line data variation and adjacent display cells.

28. (New) The display apparatus of claim 26, with said power recovery circuit being controlled by counting number of display cells to be turned on and number of display cells to be turned off in adjacency of the display cells to be turned on.